



Update on Measles, Mumps, Pertussis, Invasive Meningococcal Disease Los Angeles County

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Immunization Coalition Meeting

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Los Angeles County Department of Public Health,
Immunization Program





Vaccine-Preventable Diseases Reported in Los Angeles County (Confirmed and Probable)

<i>Disease</i>	<i>2015</i>	<i>2014</i>	<i>5-year Average</i> <i>(2010-2014)</i>
<i>Diphtheria</i>	0	0	0
<i>Haemophilus influenzae</i> <i>Type B (<15 years of age)</i>	1	0	0
<i>Measles</i>	28	13	7.6
<i>Mumps</i>	14	10	11
<i>Pertussis</i>	859	1,558	684
<i>Polio (paralytic)</i>	0	0	0
<i>Rubella</i>	0	0	0.2
<i>Congenital Rubella</i>	0	0	0.2
<i>Tetanus</i>	1	0	0.2
<i>Varicella, Hospitalized</i>	12	9	12.6
<i>Varicella, Fatal</i>	0	0	0.4



2016-2017 Measles Outbreak

- **Number of Cases: 18**
 - Median age: 13
 - None could provide proof of vaccination
 - 16 had a social group connection
- **Number of Exposed Contacts: >2,000**
 - About 10% susceptible

2016-2017 Measles Outbreak

- Cases located in other Counties
 - Ventura: 5 (one household)
 - Two were directly linked to LAC outbreak, but all were part of the impacted community
 - Santa Barbara: 1
 - Directly linked with LAC outbreak

Comparing the Outbreaks

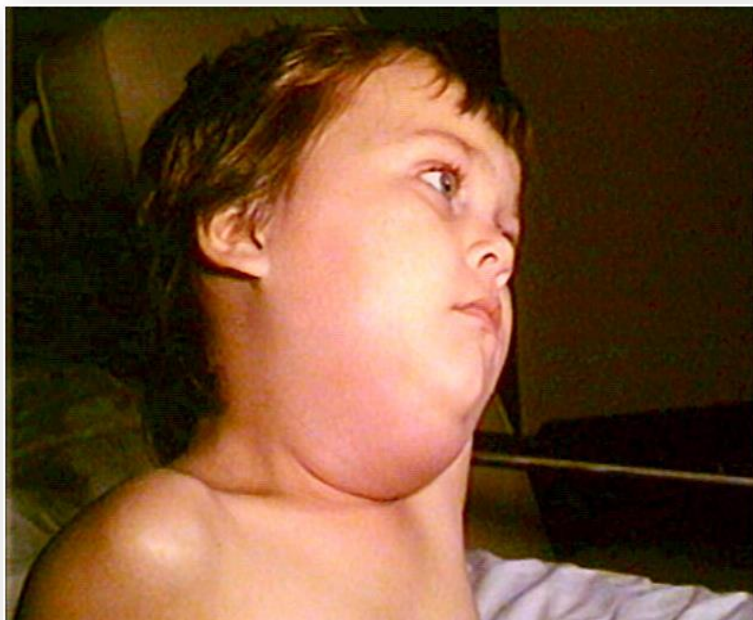
Similarities

- Most cases were not able to produce proof of vaccination
- Thousands of contacts exposed
- Outbreak was multi-jurisdictional

Differences

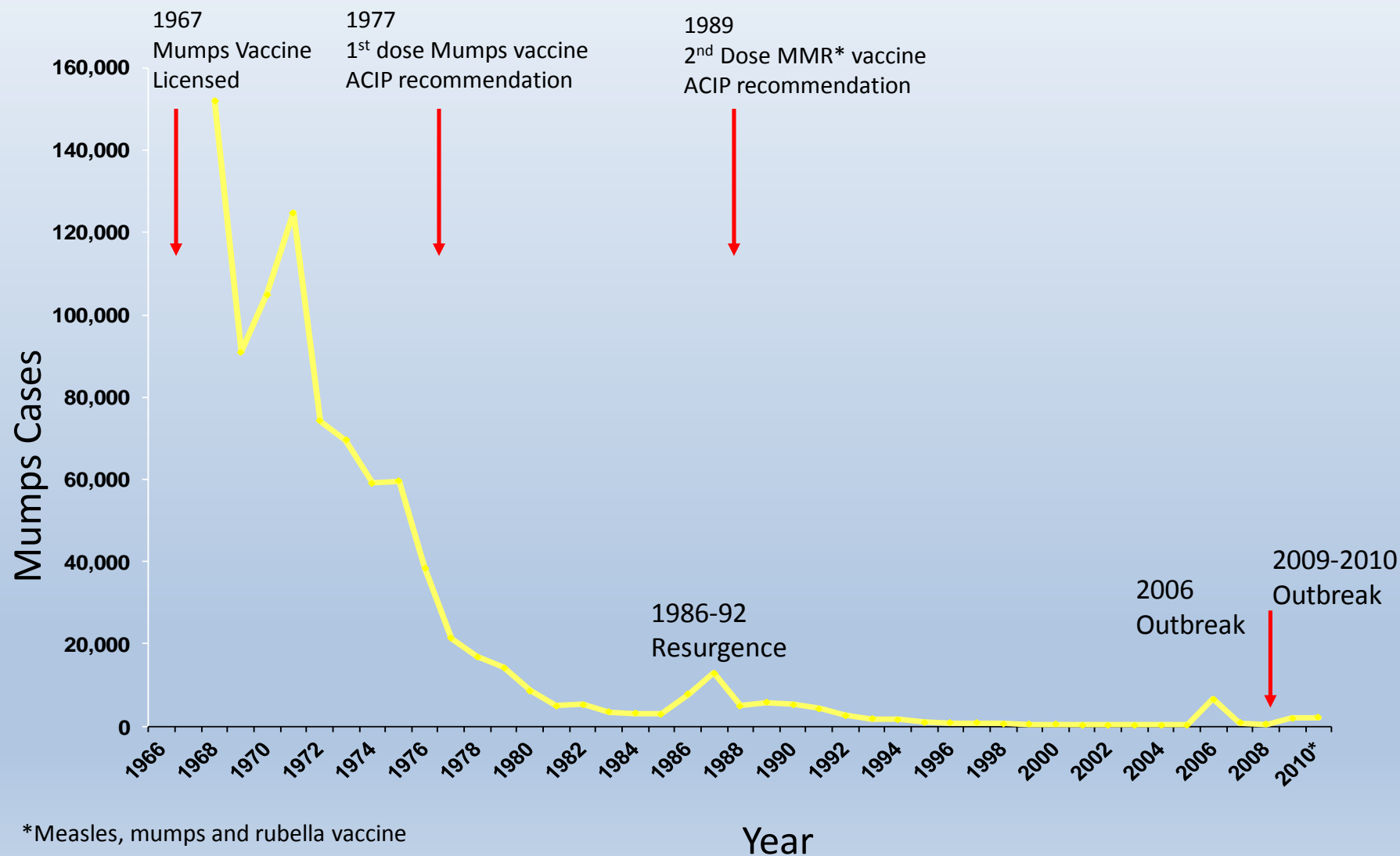
- Unverified original exposure site
- Cases confined geographically
- Duration of the outbreak
- No secondary cases from health care facilities

Mumps



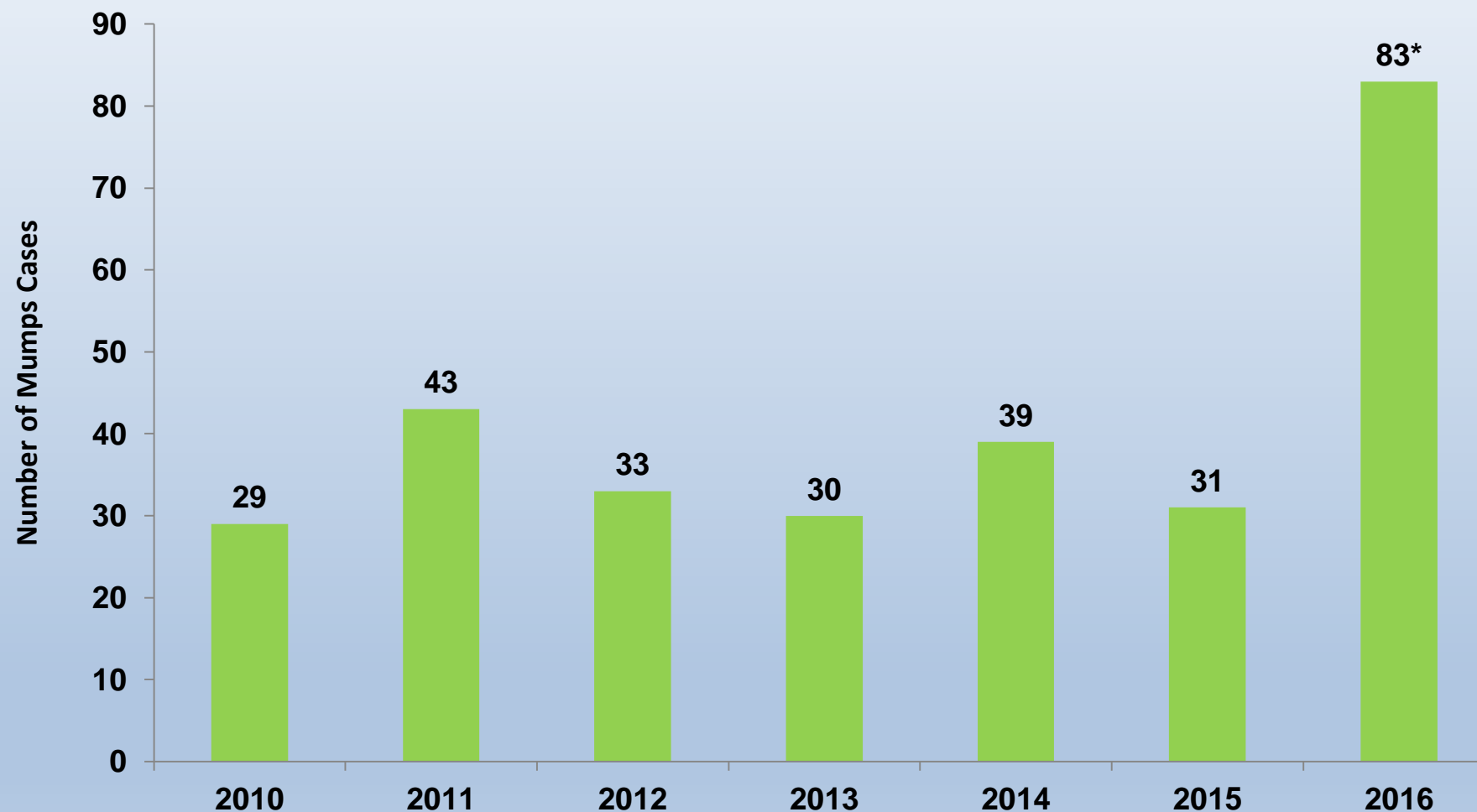


US Mumps Cases, 1968–2010





California Mumps Cases, 2010 - 2016



*Preliminary data

California Mumps Cases, 2016*

- 83 confirmed and probable cases reported with onset through 12/31/2016
- Median age: 25 year, range 0 – 95 years
- Larger proportion of college-aged cases than in prior years
- At least one college outbreak; several cases known to be linked to college outbreaks in other states

*2016 disease close out is May 2017 so data are preliminary

US Mumps Outbreaks, 2006-2016

- In 2006, a multi-state mumps outbreak involving >6,500 cases occurred, predominantly affecting Midwestern college students; although the source of the outbreak is not known, it followed a large outbreak among UK college students in 2004-2005
- In 2009-2010, two large outbreaks occurred
 - One multi-year outbreak involved >3,000 people, most of whom were high school-aged students attending Orthodox Jewish schools in NE US
 - The second outbreak involved >500 people, mostly school-aged children, in Guam
- In 2011-2013, several smaller mumps outbreaks occurred on college campuses in several states, including an outbreak of 29 cases at UC-Berkeley



US Mumps Outbreaks, 2006-2016, continued

- In 2014, college outbreaks were reported from multiple states; one community outbreak in Ohio linked to a university involved >400 people, and another outbreak affected the National Hockey League, including the Anaheim Ducks
- In 2015-2016, outbreaks were reported from several university campuses, including a number of smaller outbreaks with limited spread
 - The two largest outbreaks were from Iowa and Illinois, each involving several hundred university students; both held wide-scale vaccination campaigns
- In 2016, a very large outbreak occurred in Arkansas
 - 60% of almost 2600 cases occurred among the Marshallese population
 - The outbreak is still ongoing



Why have mumps outbreaks increased in the US over the past decade?

- **Has there been a change in the mumps vaccine used in the United States?**
 - No (the Jeryl-Lynn vaccine strain is a member of genotype A)
- **Has the predominant circulating genotype of mumps changed?**
 - Genotype G has been associated with US outbreaks since at least 2006; the Jeryl Lynn strain has been shown to neutralize the Iowa genotype G strain (Rubin, SA, et al. J. Virol. 2012;86(1):615-620)

Why have mumps outbreaks increased in the US over the past decade?

- **What has changed?**
 - Unlike measles, mumps has never been eliminated in the US, although the last large US outbreaks prior to 2006 were in 1986-1987 among older school age and college age persons who were born before routine mumps vaccination was recommended
 - Similarly to measles, decreased MMR vaccination rates in other countries, particularly in Western Europe since the Wakefield paper was published in 1999, has resulted in an increased number of mumps cases and outbreaks in these countries
 - It may be more likely for infected travelers to import mumps into the US than it was previous to this increase

Pertussis

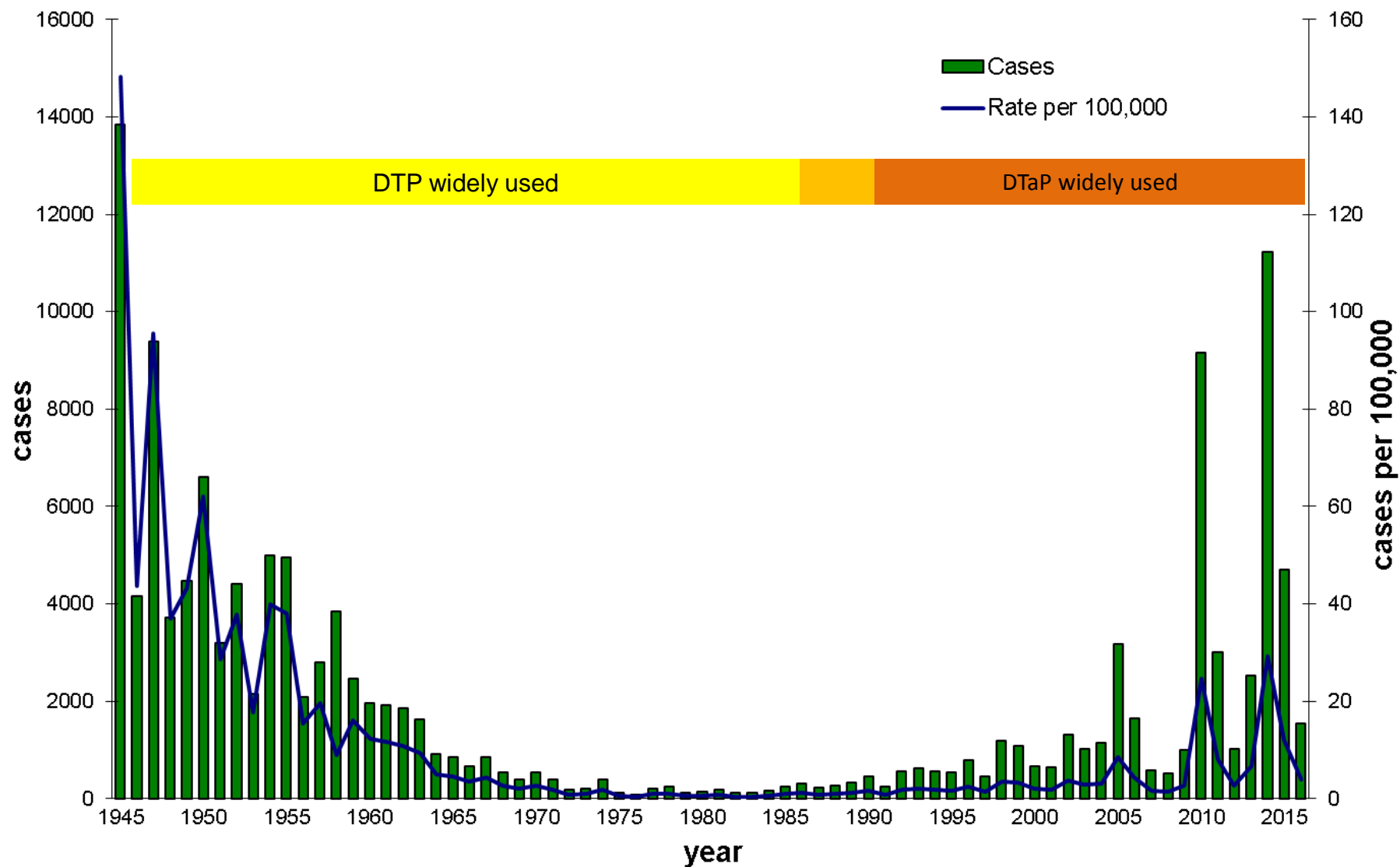


**Three pertussis infant deaths identified in California in 2014
one in 2015, and one so far in 2016**

California Pertussis Deaths

- All California pertussis deaths since 1998 have been in infants ≤ 3 months of age
- Of those with known status, all had pneumonia and pulmonary hypertension
- The median WBC count of fatal cases in 1998-2014 was 77,000 (range 15,000-148,000)
- Only 1 had received any doses of DTaP vaccine; this child was premature with bronchopulmonary dysplasia

Number and incidence of reported pertussis cases by year of onset -- California, 1945-2016*



*Includes cases reported to CDPH as of 1/23/2017

High School outbreaks

- Incidence among older children and adolescents has been increasing nationwide
- Numerous reports in CA of HS pertussis outbreaks
- 29% of pediatric cases in 2014 were in 14-16 yo age group and nearly all (98%) with data were vaccinated with Tdap
 - Median time since last pertussis vaccine was 3 years (Tdap)
 - Less than 0.5% of cases in this age group were hospitalized; none were severely ill
- San Diego study found that of 13-17 y.o adolescents with pertussis¹
 - 96% were previously-vaccinated with Tdap
 - Mean of 5.4 days of school missed (due to illness exclusion?)
 - Societal cost of \$315/household

1. Varan et al. Economic and social impact of pertussis among adolescents in San Diego County. J. Adolesc Health. 2016.



INVASIVE MENINGOCOCCAL DISEASE UPDATE